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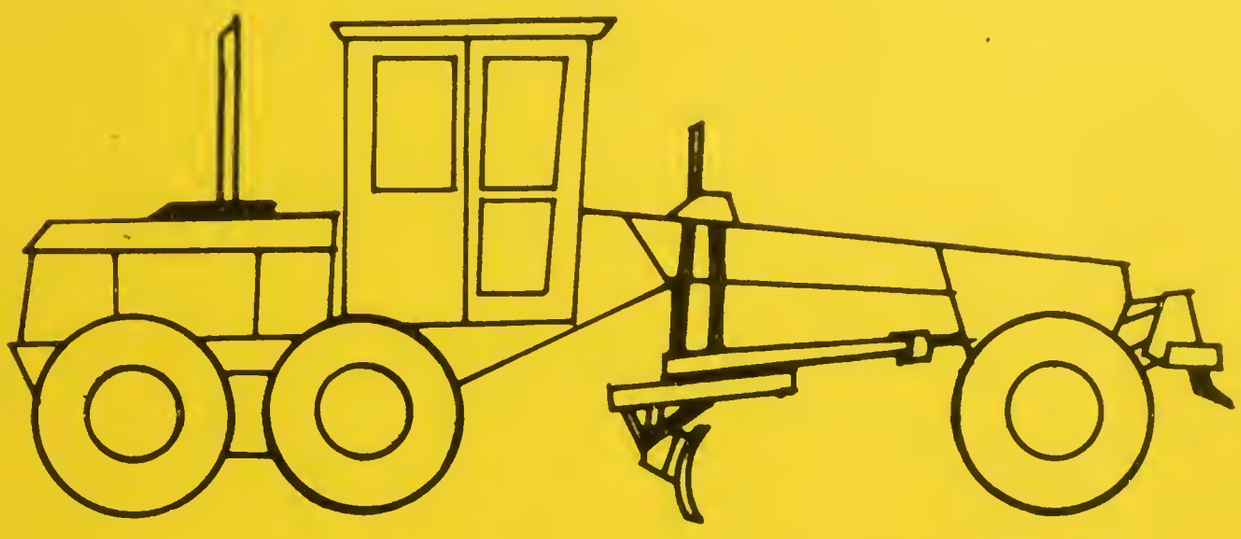
MOTOR GRADER OJT SHEETS



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MOTOR GRADER
ON-THE-JOB-TRAINING SHEETS

MONTANA DEPARTMENT OF HIGHWAYS
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SEPTEMBER 1985

ROY SYMONS - TRAINING OFFICER
MAINTENANCE AND EQUIPMENT DIVISION

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INTRODUCTION

The motor grader is one of the most complex types of equipment used in highway maintenance operations. The level of competence needed by the operators of motor graders requires hundreds of hours of operation to develop.

The On-The-Job-Training Sheets in this package are intended to guide developing operators. These training sheets cover the basic practices and procedures associated with developing a familiarity with the operations of motor graders. The experience gained through this material will be the base to develop operational competence on.

You will be assisted through coaching provided by the trainer in your area and other experienced operators. You should try different suggestions and ideas to determine what works best for you, then practice.

When you have successfully completed each OJT Sheet have your trainer or supervisor initial the appropriate number on the Table of Contents, for your records. Finishing these exercises does not mean you are proficient in that particular operation. Some of these activities will require hours of practice to develop competence. Your trainer and others will provide advice that, with practice of the procedures, will develop competence.

MOTOR GRADER
OJT SHEET #1

PERFORM PRE-START INSPECTION AND MAINTENANCE PROCEDURES

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Engine oil

__/ D. Engine coolant

__/ E. Hydraulic fluid

__/ F. Fuel

__/ G. Lubricants

__/ H. Grease gun

__/ I. Rags

__/ J. Replacement Grease Fittings

__/ K. Necessary Wrenches

__/ L. EMS-I Operator Usage Report

II. Procedure

(NOTE: Equipment defects should be corrected immediately or reported to the proper authority. Do not operate defective equipment.)

__/ A. Make a walk-around visual inspection for leaks, broken, worn, or missing parts

Clean all grease fittings and lubricate according to specifications in operator's manual (NOTE: Cleaning should include cylinders, pivot points, and drawbar bale.)

Check hydraulic system for leaking lines and connections, bent or kinked lines, and lines rubbing against other parts

__/ B. Drain condensate from air tanks and fuel sight bowls

__/ C. Check engine oil level; add oil if needed; enter amount on EMS-1

__/ D. Check engine coolant level; add coolant if needed (50/50 mixture)

__/ E. Check belts for tension and condition

__/ F. Check battery connections for tightness and corrosion

__/ G. Check battery electrolyte level; add water if needed

__/ H. Check electrical wire connections and insulation

__/ I. Check air cleaner; remove and clean filter if necessary; empty dust cup

__/ J. Check hydraulic fluid level; add fluid if needed.

__/ K. Check fuel level; add fuel if necessary

__/ L. Check brakes

__/ M. Check tires and wheels

__/ N. Clean windshield and mirrors; adjust mirrors

__/ O. Remove trash

__/ P. Check lights

__/ Q. Check safety devices

R. Check major components

__/ 1. Circle drive, for leaks

__/ 2. Lubricate or clean circle according to factory recommendations

__/ 3. Blade and end bits, for wear, damage, loose or missing parts

__/ 4. Blade linkage, for excessive play, damage, loose or missing parts

__/ 5. Pivot point and blade slides, for dirt or debris buildup

MOTOR GRADER
OJT SHEET #2

LEVEL I - OPERATOR SERVICE

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Tool kit

__/ D. Air supply

__/ E. Grease gun

__/ F. Lubricants

__/ G. Cleaning solvents

__/ H. Rags

__/ I. Water

__/ J. Engine coolant

__/ K. Engine oil

__/ L. Hydraulic fluid

__/ M. Transmission fluid

__/ N. Brake fluid

__/ O. Tire pressure gauge

__/ P. Fuel

__/ Q. Replacement Grease Fittings

__/ R. Necessary filters

__/ S. EMS-1 Operator Usage Report

II. Procedure

(NOTE: Follow departmental preventive-maintenance program when servicing equipment. Refer to operator's manual for lubrication chart and for manufacturer's recommendations for servicing specific components and attachments.)

__/ A. Make a walk-around visual inspect for leaks broken, worn, or missing parts

(NOTE: Major repairs and replacements should be reported to the proper authority and completed by a trained mechanic.)

__/ B. Change engine oil and filter; check the box on EMS-1

__/ C. Check engine coolant level and strength, radiator cap, hoses, and radiator; add coolant if needed

(CAUTION: Do not remove radiator cap unless engine is cool; then, open cap slowly to release pressure.)

__/ D. Clean air filter; replace if necessary

__/ E. Check fuel level, fuel filters, and sediment bowl (where applicable); fill fuel tank if necessary

__/ F. Check battery electrolyte level, battery cables, and connectors; add water if needed

(CAUTION: Keep sparks and flames away from battery.)

__/ G. Check exhaust system for loose connections and holes

__/ H. Check hydraulic fluid levels; filters, hoses, lines, and fittings, look for leaks; add fluid if required

__/ I. Check transmission fluid level; add fluid if needed

__/ J. Check transmission pressure-line filter and breather

__/ K. Check brake adjustment and condition

__/ L. Check brake master-cylinder fluid level; fill if necessary

__/ M. Check fluid level in tandem drive cases; add fluid if needed

__/ N. Check fluid level in circle-reverse gear case; add fluid if needed

__/ O. Check clutch for proper adjustment

__/ P. Check belts for tension and condition; adjust or replace if necessary

__/ Q. Check wiring, insulation, and connections

__/ R. Clean and lubricate all grease fittings according to recommendations in operator's manual

__/ S. Check condition of tires

__/ T. Check tire pressure; inflate to recommended pressure if necessary.

__/ U. Check all safety devices

__/ V. Check and clean windshield and windshield wipers

W. Check major components and/or accessories

__/ 1. Scarifier or other accessories

__/ 2. Circle drive, for leaks

__/ 3. Lubricate or clean circle according to factory recommendations

__/ 4. Blade and end bits, for wear, damage loose or missing parts

__/ 5. Blade linkage, for excessive play, damage, loose or missing parts

__/ 6. Pivot points and blade slide, for dirt or debris buildup

__/ X. Enter all necessary information on EMS-1; check Level 1 Service

__/ Y. Report time and materials for MMS Activity Number 9401 Equipment Maintenance

MOTOR GRADER
OJT SHEET #3

START, OPERATE, SHUT-DOWN, AND SECURE

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Materials for pre-start inspection

__/ D. EMS-I Operator Usage Report

II. Procedure for starting engine and operating motor grader

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Set parking brake

__/ F. Place transmission in neutral

__/ G. Place all controls in hold, neutral, or off position

H. Start engine

(NOTE: In cold weather, check operator's manual for cold-weather starting procedures.)

__/ 1. Move engine-speed control to halfway position and depress accelerator pedal

__/ 2. Depress oil-pressure-bypass switch when applicable; turn key to cranking position

__/ 3. Release key when engine starts

(CAUTION: Do not crank engine for more than thirty seconds. Allow starter to cool for at least two minutes before attempting to start it again.)

__/ 4. Release bypass switch when lubricating oil reaches operating pressure

__/ H. Allow engine to warm up

__/ I. Check gauges

__/ J. While parking brake is set, operate all equipment controls possible

EXAMPLES: Raise and lower blade, shift blade, tilt blade, raise and lower right and left blade ends, rotate circle, shift circle, raise and lower scarifier or accessories, lean wheels, articulate

(NOTE: See operator's manual for specific instructions.)

__/ K. Set engine-speed control at low idle

__/ L. Raise all implements

__/ M. Depress clutch if machine is so equipped

__/ N. Position gearshift lever in proper gear

__/ O. Release parking brake

__/ P. Release clutch pedal if machine is so equipped; gradually depress accelerator

__/ Q. Shift gearshift level into proper speed ranges as motor grader moves forward

(NOTE: Downshift one gear at a time. When downshifting under a load, increase engine speed to match ratio of lower gear.)

R. Stop grader

__/ 1. Decrease engine speed by depressing decelerator

__/ 2. Apply pressure to brake pedal

__/ 3. Disengage clutch if applicable

__/ 4. Shift gearshift level to neutral

__/ 5. Shift range-shift lever to neutral

__/ S. Operate grader through forward and reverse gear ranges

(NOTE: Bring grader to a complete stop before shifting from forward to reverse gears or from reverse to forward gears.)

__/ T. Practice turns

__/ U. Engage wheel-lean and operate motor grader in forward and reverse; turn

(NOTE: Leaning the wheels will lower the relative position of the blade.)

__/ V. While in low gear and driving slowly, practice manipulating equipment controls

(NOTE: Do not make contact with surface during this practice.)

III. Procedure for shutting down engine and securing motor grader

(NOTE: When securing a motor grader, position the moldboard so that it is inboard of the wheel tracks for traveling. Drive the motor grader to the designated securing area and position it in a safe manner.)

__/ A. Bring motor grader to a stop

__/ B. Lower moldboard, scarifier, or any other hydraulically operated equipment

__/ C. Set parking brake

__/ D. Allow engine to idle three to five minutes at no load before shutting down

(NOTE: This permits the engine to cool down and allows for gradual and uniform cooling of engine parts. It also allows the turbocharger to slow down.)

__/ E. Place engine-speed control in shutoff position

__/ F. Turn key switch to off position

__/ G. Relieve hydraulic pressure by moving levers and steering wheel until there is no response

__/ H. Dismount, using grab irons and steps

__/ I. Make final visual inspection for leaks, broken, loose, worn, or missing parts

__/ J. Enter appropriate data on EMS-I

__/ K. Report time and equipment for appropriate MMS Activity Number

MOTOR GRADER
OJT SHEET #4

TURNING AROUND

I. Equipment

__/ A. Motor grader

__/ B. Operator's manual

__/ C. EMS-1 Operator Usage Report

II. Procedure

(NOTE: When a motor grader makes a number of passes over a distance of less than 1,000 feet, it is usually more efficient to back the grader the entire distance to the starting point than to turn around and continue working from the far end. But, if your passes cover a distance of 1,000 feet or more, as in snow removal, it is more efficient to turn the grader around and start blading from the far end to the starting point. The combined maneuvering advantages of leaning wheels and tandem drive are a big help in turning the machine around.)

__/ A. Lean front wheels in direction of turn (A)

(NOTE: This will move the front end of the motor grader over and enable you to make a shorter turn.)

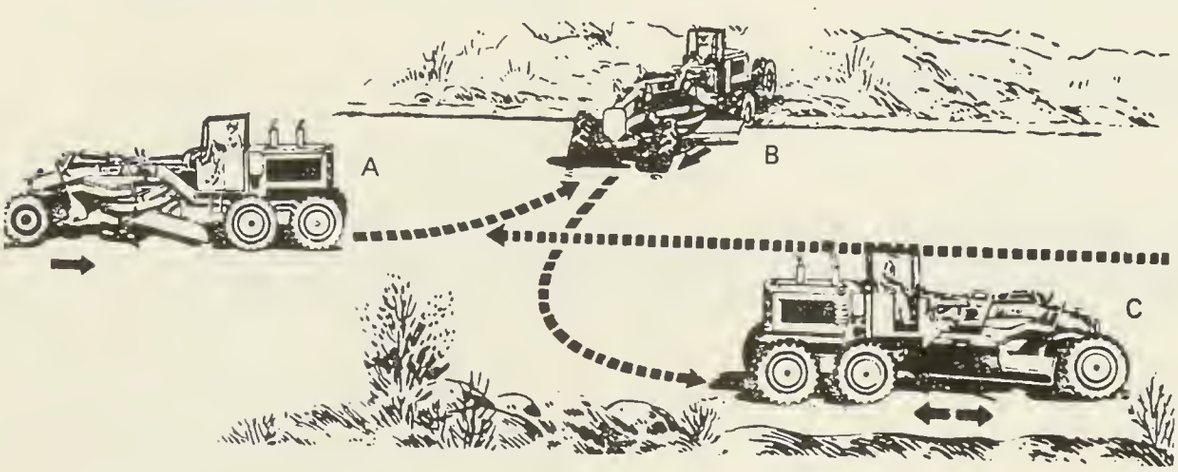
__/ B. Back across the ditch or roadway (B)

__/ C. Stop motor grader and shift gears

__/ D. Lean front wheels in other direction

__/ E. Complete the turn (C)

(NOTE: You will find that when you leave the wheels on grade and lean in the direction of the turn, the motor grader will make the turn with ease. Always back across the road or ditch and leave the front wheels on the roadway.)



MOTOR GRADER
OJT SHEET #5

OPERATING AN ARTICULATED MOTOR GRADER

I. Equipment and materials

__/ A. Articulated motor grader

__/ B. Operator's manual

__/ C. EMS-I Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

__/ K. With motor grader in straight mode, move forward through gearshift range

__/ L. Stop motor grader; place in articulated mode; lean front wheels

M. Operate in articulated mode

(CAUTION: Articulation can force the blade against a rear tire.)

__/ 1. Steer by articulating

(NOTE: With the rear module on center, without moving the steering wheel, the motor grader can be steered to the left or right by sharply articulating the rear module gradually.)

(CAUTION: When the front tends to veer out of line, articulate the rear module in the opposite direction enough to overcome this tendency and hold the machine in line.)

2. Turn motor grader around

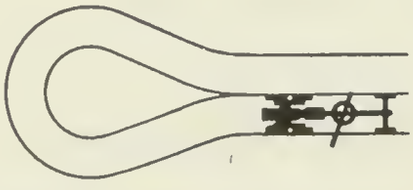
__/ a. Lean wheels as you turn motor grader; turn right articulate right

(NOTE: Leaning the wheels will decrease the turning radius. To turn right, lean the wheels to the right and articulate to the right. To turn left, lean the wheels to the left and articulate to the left.)

__/ b. Turn left and articulate left

__/ c. Turn right and articulate right

__/ d. Articulate straight



__/ N. Place in straight mode and stop motor grader

__/ O. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ P. Dismount, using grab irons and steps

__/ Q. Make final visual inspection for leaks, broken, worn, loose, or missing parts

__/ R. Enter appropriate data on EMS-I

__/ S. Report time and equipment for appropriate MMS Activity Number

MOTOR GRADER
OJT SHEET #6

MAKING A WINDROW

I. Equipment

__/ A. Motor grader

__/ B. Operator's manual

__/ C. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

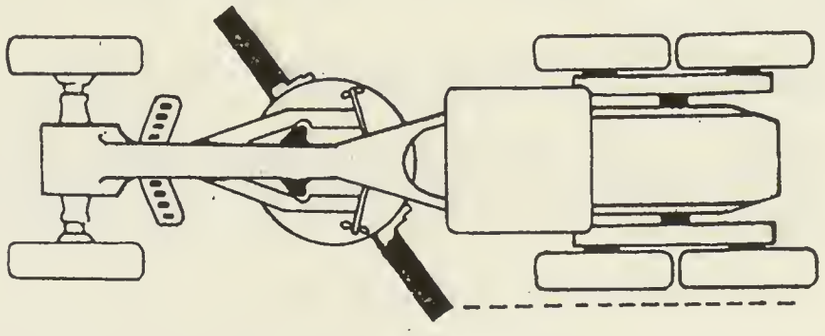
__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

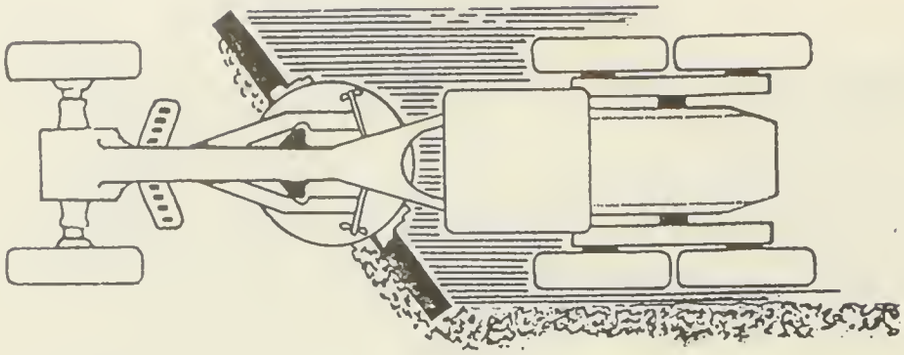
__/ J. Release parking brake; proceed to work area

__/ K. Circle blade left to position toe of blade behind right front tire

__/ L. To avoid driving over windrow, slide blade shift so that heel is clear of left tandem drive wheels



__/ M. Lower toe and heel of blade to begin cutting material



(NOTE: As desired depth is reached, material should flow freely to heel of blade and form the windrow.)

__/ N. Continue making windrow until reaching end of cut

__/ O. Raise blade clear of ground and stop

__/ P. Stop and select first forward gear

__/ Q. Move machine to the left and position right front tire to right of previous windrow (straddle previous windrow with motor grader)

__/ R. Lower blade to ground to make a light grading pass; observe material flowing to left heel of blade

__/ S. As windrow becomes larger, the motor grader's front tires should lean toward windrow to counteract side drift

(NOTE: Leaning the wheels will lower the blade and shift it slightly in the direction of the lean.)

__/ T. Continue process until windrow is desired size

__/ U. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ V. Dismount, using grab irons and steps

__/ W. Make final visual inspection for leaks, broken, worn, loose, or missing parts; clean off any materials that built up on the circle, front axle, etc.

__/ X. Enter appropriate data on EMS-1

__/ Y. Report production for appropriate MMS Activity Number

MOTOR GRADER
OJT SHEET #7

DRYING AGGREGATE

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Aggregate materials

__/ D. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

III. Procedure for rigid-frame motor grader

__/ A. Pitch blade forward

(NOTE: This blade position will create a rolling and mixing action in the material.)

__/ B. Start first pass, cut out a manageable amount of material and spiral it into windrow

__/ C. Continue cutting and moving material back and forth until it is surface dry

IV. Procedure for an articulated motor grader

__/ A. Pitch blade forward

__/ B. Articulate tandems and lean front wheels toward pile

(NOTE: This puts the weight of the machine behind the point of maximum load while allowing the front wheels to run on level ground

__/ C. Extend moldboard and circle as needed

__/ D. Start first pass, cut out a manageable amount of material and spiral it into a windrow

__/ E. Continue cutting and moving material back and forth until it is surface dry

V. Procedure

__/ A. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ B. Dismount, using grab irons and steps

__/ C. Make final visual inspection for leaks, broken, worn, loose, or missing parts

__/ D. Enter appropriate data on EMS-1

__/ E. Report production for appropriate MMS Activity Number

MOTOR GRADER
OJT SHEET #8

BLADE MIXING

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Sand, aggregate, asphalt material or salt

__/ D. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

III. Procedure for rigid-frame motor grader

__/ A. Pitch blade forward

(NOTE: This blade position will create a rolling and mixing action in the material.)

__/ B. Start first pass, cutting approximately one-third of windrow material; spread this material on the mixing floor

__/ C. Spread the other material to be mixed on top

__/ D. Continue cutting and moving windrow in portions until the required material is layered

__/ E. Work the material in a rolling motion until proper mix is achieved

IV. Procedure for an articulated motor grader

__/ A. Pitch blade forward

__/ B. Articulate tandems and lean front wheels toward pile

(NOTE: This puts the weight of the machine behind the point of maximum load while allowing the front wheels to run on level ground.)

__/ C. Extend moldboard and circle as needed

__/ D. Start first pass, cutting approximately one-third of windrow material; spread material on the mixing floor

__/ E. Spread the other material to be mixed on top

__/ F. Continue cutting and moving windrow in portions until the required material is layered

__/ G. Work the material in a rolling motion until proper mix is achieved

IV. Procedure

__/ A. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ B. Dismount, using grab irons and steps

__/ C. Make final visual inspection for leaks and for broken, worn, loose, or missing parts; clean off any materials that built up on the circle, front axle, etc.

__/ D. Enter appropriate data on EMS-1

__/ E. Report production for MMS Activity Numbers 8402 or 8404

V. References

Page 16; MDOH; Motor Grader Operations Manual
Page 67; MDOH; Asphalt Pavement Maintenance Reference Manual

MOTOR GRADER
OJT SHEET #9

SNOW REMOVAL

I. Equipment

__/ A. Motor grader

__/ B. Operator's manual

__/ C. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

(CAUTION: Steps and irons could have ice on them.)

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

__/ K. Downshift to working speed

__/ L. Pitch moldboard forward

__/ M. Rotate circle to sidecast material

__/ N. Line up left front wheel of motor grader on center line of road

__/ O. Lean wheels in direction of sidecast snow

__/ P. Lower blade to touch pavement

(NOTE: Excessive down pressure reduces steering and traction.)

__/ Q. Continue removing snow until destination is reached

(NOTE: Check blade wear frequently during operation to prevent moldboard damage.)

__/ R. Raise blade and turn machine around

__/ S. Reposition motor grader on opposite side of road for return pass

__/ T. Line up left side, placing wheel on grade area

__/ U. Lower blade to pavement and continue snow removal while making any adjustments necessary to avoid scarring road

__/ V. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ W. Dismount, using grab irons and steps

__/ X. Make final visual inspection for leaks, broken, worn, loose, or missing parts

__/ Y. Enter appropriate data on EMS-1

__/ Z. Report time and production for MMS Activity Number 7202 Snow Removal

MOTOR GRADER
OJT SHEET #10

GRADING AGGREGATE SURFACE ROADS

I. Equipment

__/ A. Motor grader

__/ B. Operator's manual

__/ C. EMS-1 Operator Usage Report

II. Procedure

(NOTE: The ideal time for grading an unpaved road is after the roadbed has received moisture and has dried out just enough so that the binding material will stick to the larger pieces, cementing it all.)

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

__/ K. Make sure traffic-control devices are in place

(NOTE: Do not work beyond the effective distance of your signing.)

__/ L. Downshift to working speed

__/ M. Set a flat blade with a moderate angle to carry the material

(NOTE: Use moderate down pressure to shave the high spots and carry that material to low spots.)

__/ N. Position motor grader to grade from right barrow ditch or shoulder toward center of road on first pass

__/ O. Lower blade to desired depth of cut when motor grader is in position

(NOTE: Start on right side of road with toe of blade at bottom of barrow ditch or at edge of shoulder.)

__/ P. Begin grading, windrow aggregate at roadway center

__/ Q. At end of graded section, raise blade and turn motor grader around

__/ R. Repeat the same process returning on the other side of the road, continue back to starting point

__/ S. At end of graded section, raise blade and turn motor grader around

__/ T. Set necessary blade angle with the toe of blade back of left front wheel

__/ U. Position the motor grader to grade from the crown toward the shoulder, don't waste aggregate in the barrow ditch

(NOTE: If road is left flat or low in the center, water will not drain to the sides. Poor drainage creates a condition that causes early potholes and ruts.)

__/ V. Move motor grader off pavement to a safe level parking place

__/ W. Set the emergency brake

__/ X. Lower blade to the ground

__/ Y. Inspect the work

__/ Y. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ Z. Dismount, using grab irons and steps

__/ AA. Make final visual inspection for leaks and for broken, worn, loose, or missing parts

__/ BB. Enter appropriate data on EMS-1

__/ CC. Report production for MMS Activity Number 1108

III. Reference

Page 18; MDOH: Motor Grader Operations Manual

MOTOR GRADER
OJT SHEET #11

SCARIFY

I. Equipment and materials

__/ A. Motor grader equipped with scarifier log and teeth

__/ B. Operator's manual

__/ C. 24-ounce ball peen hammer

D. Recommended safety equipment

__/ 1. Hard hat

__/ 2. Gloves

__/ 3. Close-fitting clothing

__/ E. EMS-1 Operator Usage Report

II. Procedure

(NOTE: This procedure is for scarifying a section of single-course surface treatment.)

__/ A. Read operator's manual

__/ B. With ball peen hammer, insert full set of teeth (usually eleven) in scarifier

__/ C. Follow pre-start inspection procedure

__/ D. Review operator's manual for specific instructions

__/ E. Sit in operator's seat and secure seat belt

__/ F. Mount motor grader, using steps and grab irons

__/ G. Following procedure start engine; allow proper warm up

__/ H. Check all gauges and controls for proper functioning

__/ I. Set engine-speed control for desired rpm (low idle)

__/ J. Position gearshift lever in proper gear

__/ K. Raise all implements

__/ L. Release parking brake; proceed to work area

__/ M. Be sure that all traffic-control devices are in place

__/ N. Position grader about 20 feet from starting point on right side

__/ O. Lower scarifier log until teeth are about 2 inches above pavement

__/ P. Shift transmission into low range

__/ Q. Move forward at a speed that allows you to reach operating speed and lower scarifying teeth to desired cutting depth at starting point

(NOTE: If motor grader lugs or stalls, there are two options: (1) reduce the depth of the cut of (2) remove a tooth or teeth from each side end of the log. Always take the same number of teeth from each side of log, to balance applied force.)

__/ R. Continue scarifying in a straight line; any side torque can break off teeth

(NOTE: If teeth have a tendency to ride on top of the road surface, adjust pitch nearer to 90 degrees to the pavement. This adjustment can be made while the motor grader is moving. See operator's manual.)

__/ S. When end of scheduled distance to be scarified is reached, raise teeth 4 inches to 6 inches above pavement

__/ T. Turn motor grader around

(NOTE: If the scarifier log is mounted in front of the front wheels, turn grader in the normal way. If the log is mounted behind the front wheels, rotate the blade while teeth are in scarifying position.)

__/ U. Repeat steps N through S

__/ V. Continue until entire width of the surface has been scarified

__/ W. Raise teeth to travel height

__/ X. Move motor grader off pavement to a safe level parking place

__/ Y. Put on emergency brake

__/ Z. Lower blade to the ground

__/ AA. Inspect the work

__/ BB. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ CC. Dismount, using grab irons and steps

__/ DD. Make final visual inspection for leaks and for broken, worn, loose, or missing parts

__/ EE. Enter appropriate data on EMS-1

__/ FF. Report production for appropriate MMS Activity Number

MOTOR GRADER
OJT SHEET #12

V - DITCH CONSTRUCTION

I. Equipment

__/ A. Motor grader

__/ B. Operator's manual

__/ C. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

__/ K. Operate side shift to extreme left

(NOTE: With an articulated motor grader, articulate so that tandems run outside of the "V" where traction is better.)

__/ L. Rotate circle until toe of blade is directly behind right front wheel

__/ M. Raise left lift cylinder to full UP

__/ N. Lower right blade-lift cylinder to set blade tip for desired depth of cut

__/ O. Lean front wheels to left and make a 4-inch to 5-inch marking cut

(NOTE: Leaning will counteract side drift of blade. Keep blade toe in line with outside edge of lead tire while maintaining a straight line.)

__/ P. Continue cutting to desired depth, keeping front tire in bottom of ditch

(NOTE: Each ditch cut should be made as deep as possible with blade toe in line with center of lead tire, and without stalling grader

__/ Q. Continue ditching and bringing successive cuts in from edge of bank slope; blade toe will be in line with bottom of ditch on final cut

__/ R. Move motor grader off pavement to a safe level parking place

__/ S. Put on emergency brake

__/ T. Lower blade to the ground

__/ U. Inspect the work

III. Procedure for wet-ditch grading with an articulated motor grader

(NOTE: This procedure may be used for wet-ditch grading, or to avoid obstructions when cleaning old ditches that may have tree overhangs, or rock ledges

__/ A. Articulate motor grader so that front wheels and blade are in the ditch

__/ B. Steer with front wheels

__/ C. Keep rear wheels on shoulder to prevent wheels from slipping in wet or soft material in ditch

IV. Procedure

__/ A. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ B. Dismount, using grab irons and steps

__/ C. Make final visual inspection for leaks and for broken, worn, loose, or missing parts

__/ D. Enter appropriate data on EMS-1

__/ E. Report production for MMS Activity Number 3106

V. Reference

Pages 13-15; MDOH: Motor Grader Operations Manual

MOTOR GRADER
OJT SHEET #13

GRADING APPROACHES

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Aggregate material

__/ D. EMS-1 Operator Usage Report

II. Procedure

__/ A. Follow pre-start inspection procedure

__/ B. Review operator's manual for specific instructions

__/ C. Mount motor grader, using steps and grab irons

__/ D. Sit in operator's seat and secure seat belt

__/ E. Following procedure start engine; allow proper warm up

__/ F. Check all gauges and controls for proper functioning

__/ G. Set engine-speed control for desired rpm (low idle)

__/ H. Position gearshift lever in proper gear

__/ I. Raise all implements

__/ J. Release parking brake; proceed to work area

__/ K. Make sure all traffic-control devices are in place

__/ L. Set machine on oil surface in center of approach; drive into approach striking off any high spots and carry excess material to a pile at the end of the work area

__/ M. Raise the blade and turn around

__/ N. Pick up the pile and carry it toward the oiled surface

(NOTE: If additional material is needed, dump it on the pile you already have.)

__/ O. Set up a small windrow to outline each side of the approach

__/ P. Turn around on the oil to enter the approach at an angle

__/ Q. Spread the material in the windrow across the approach from each side

__/ R. Excess material can be spread out on the back of the approach

__/ S. Move motor grader off pavement to a safe level parking place

__/ T. Put on emergency brake

__/ U. Lower blade to the ground

__/ V. Inspect the work

__/ W. Return to parking area; stop and secure motor grader; follow shutdown procedure

__/ X. Dismount, using grab irons and steps

__/ Y. Make final visual inspection for leaks and for broken, worn, loose, or missing parts

__/ Z. Enter appropriate data on EMS-1

__/ AA. Report production for MMS Activity Number 2104

MOTOR GRADER
OJT SHEET #14

CHANGE THE BLADE

I. Equipment and materials

__/ A. Motor grader

__/ B. Operator's manual

__/ C. Tool kit containing wrenches of the correct size

__/ D. Two sections of replacement blades (cutting edges)

__/ E. Plow bolts with nuts of the correct size for replacement if necessary

__/ F. Four 6" x 6" blocks

__/ G. Wire brush

H. Recommended safety equipment

__/ 1. Hard hat

__/ 2. Gloves

__/ 3. Close-fitting clothing

II. Procedure

(NOTE: If end bits need to be replaced, do so while the ends of the moldboard are suspended for replacing the cutting edges.)

__/ A. Block tandem wheels, front and back

__/ B. Mount cab correctly and sit in operator's seat

__/ C. Follow starting procedure

(NOTE: Make sure parking brake is set.)

__/ D. Lower moldboard until it just touches ground with no down pressure

__/ E. Follow shut-down procedure and dismount, using grab iron and steps

__/ F. Remove bolts from one section of cutting edge at a time

__/ G. Dislodge blade

(NOTE: Stand in a position so that the blade falls away from you off of the moldboard.)

__/ H. Clean matching surfaces with wire brush

__/ I. Set new section of cutting edge in place

__/ J. Insert bolts and secure with nuts

(NOTE: If bolts are worn, replace them.)

__/ K. Tighten bolts

__/ L. Remove blocks from wheels

__/ M. Mount machine properly and start motor grader

__/ N. Lower moldboard until full weight is on ground

__/ O. Move all controls to neutral position

__/ P. Follow shut-down procedures

__/ Q. Dismount, using grab irons and steps

__/ R. Properly store tools and blocks; store worn cutting edges for proper disposition

__/ S. Report time and equipment for appropriate MMS Activity Number 9401 Equipment Maintenance

III. Alternate procedures

__/ A. Raise blade evenly about 8 inches above ground; place a block at each end of moldboard to change both sections at once

__/ B. Raise one end of moldboard until opposite end rests on ground; change one section; reverse procedure and change the other section

__/ C. Side shift the moldboard to one side; change one section; reverse procedure and change the other section

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